



Australian Bureau of Statistics

2959.0 - Census Working Paper 94/1 - Labour Force Status, 1991

Latest ISSUE Released at 11:30 AM (CANBERRA TIME) 21/06/1994

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Census Working Paper 94/1

1991 CENSUS DATA QUALITY: LABOUR FORCE STATUS

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INTRODUCTION

The aim of this paper is to provide an assessment of the quality of data on labour force status from the 1991 Census. The series of questions on the labour force is a very complex part of the Census form and final data quality depends on the quality of responses provided to the individual questions and to the rules applied in deriving final Labour Force Status codes.

A labour force status is assigned to everyone aged 15 years or older for whom sufficient information is provided. People are classed as either in the labour force or not in the labour force. Those in the labour force are then classed as employed or unemployed. The 'status of worker' is then determined for employed people as: wage or salary earner, self-employed and not employing others, self-employed and employing others or unpaid helper in a family business. Unemployed people are classed as either looking for full-time or part-time work. This paper will focus on the broad labour force status categories of employed, unemployed and not in the labour force.

Users require Census labour force data for assessing labour force changes for small population groups (eg. Aboriginal and Torres Strait Islander people or migrants from particular countries) and within small geographic areas. While regular ABS surveys (most importantly the monthly Labour Force Survey) provide data on labour force status of persons for States and broad regions within States, they cannot provide accurate small area data or data for small groups of the population due to small sample size.

In the 1991 Census, Labour Force Status (LFS) was primarily derived from five questions: Full/Part-time Job, Looked For Work, Job Last Week, Hours Worked and Travel to Work. The first three questions were the *core* questions for deriving labour force status. Responses to the other two questions were used only when responses were missing for the core questions. If no responses were provided for any of the questions, the person was coded as Not Stated. Edits applied at later stages altered some of the codes initially assigned.

Comparison of 1991 Census data and data from the corresponding Labour Force Survey forms a major part of this analysis. Differences in scope and estimation techniques have been analysed in detail. In addition, the paper encompasses an analysis of Not Stated codes for Labour Force Status and a summary of the performance of sequencing instructions for the core labour force questions. Changes in form design and processing over time are discussed below.

Question history

Questions on labour force status have been asked in every Australian Census since 1911.

In the 1960s the ABS decided to work towards greater conceptual consistency across its collections concerning labour force information, and thus started to use International Labour Organisation (ILO) definitions in the 1966 Census.

Since then a variety of questions have been used to determine a person's labour force status and, if employed, his/her status in employment. The 1981 and 1986 Census questions are shown in Appendix 1.

For the 1986 Census an effort was made to make the concepts and instructions used in the core labour force questions more consistent with those used in the ABS labour force surveys. A series of important changes were implemented:

- A person was classified as unemployed if he or she actively looked for work in the **last four weeks**, rather than last week as in the 1981 Census.
- Unemployed persons were for the first time classified as looking for full-time or part-time work.
- Unpaid workers in a family business who **worked at least one hour** in the reference week were included in the labour force (as recommended by the ILO at the 1982 International Conference of Labour Statisticians), whereas the previous cut-off had been 15 hours.

The wording of the core labour force questions has remained almost unchanged between the 1986 and 1991 Censuses. However, in addition to the changes in appearance required by the different processing technology, the following changes to the design of the questions were implemented in the 1991 Census:

- Sequencing instructions on the 1991 Census form were located in the response area of the relevant question and were in bold print.
- The instruction concerning 'main job' in the question on Job Last Week was introduced in order to reduce the non-response rate for that question.

The 1991 Census asked the same three core questions to derive labour force status as in the 1986 Census. The 1991 questions are shown below:

30 Last week, did the person have a full-time () Yes, worked for payment or profit. or part-time job of any kind ? Now go to 32

() Yes, but absent on holidays,
on sick leave, on strike or
temporarily stood down.

Now go to 32

() Yes, unpaid work in a family
business. **Now go to 32**

() Yes, other unpaid work.

() No, did not have job

31 Did the person actively look for work () No, did not look for work. at any time in the last 4 weeks ? Now go to 40

Actively looking for work means checking or being () Yes, looked for full-time work. registered with the Commonwealth Employment Service; **Now go to 40**
writing, telephoning or applying in person to an () Yes, looked for part-time work. employer for work; or advertising for work. **Now go to 40**

32 In the main job held last week, () A wage or salary earner?

was the person : () Conducting own business

Mark one box only. but not employing others?

If the person had more than one job last week () Conducting own business

then 'main job' refers to the job in which and employing others?

the person usually works the most hours. () A helper not receiving wages or salary?

Coding history

In the 1976 and 1981 Censuses a labour force status was clerically assigned to **all** persons over 15 years of age. If one or more core labour force questions were not answered, labour force status was imputed using other information on the Census form.

The extent to which labour force status was imputed in the 1976 and 1981 Censuses proved to be problematic. An evaluation of 1981 Census data found this to be the cause of considerable error in labour force data (1981 Census Working Paper No E7, 'Data Quality Evaluation'). The practice of imputing 'Employed' for females aged 15 to 60 for whom no other responses were provided was believed to have contributed to the large non-response recorded for the occupation question, as a high proportion of females with imputed labour force status may in fact not have been employed.

The 1986 and 1991 Censuses included a category of Not Stated in the Labour Force Status variable for people for whom the actual value could not be determined. In 1986, Labour Force Status was derived from the answers to the three core questions: Full/Part-time job, Looked for work and Job last week. Only two of the three questions should have been answered by any one person. If labour force status could not be derived from these questions, then coders who had access to the Census form attempted to derive labour force status. Where it was still not possible to determine a labour force status, a Not Stated code was assigned. An edit applied in the 1986 Census identified people who had a Labour Force Status of employed but no response to the following labour force questions, including Occupation and Industry. The Labour Force Status for these people was determined by coders following guidelines and some people who were originally coded as employed were recoded to Not In the Labour Force.

In 1991, the derivation of Labour Force Status was fully automated using a decision table similar to that used in 1986, although with a few differences, including the use of two additional questions to determine Labour Force Status where it was unclear. Occupation and Industry information were not used however if a person was identified as having a non-market occupation, for example, housewife/husband, student or pensioner, then their Labour Force Status would be reset to Not In the Labour Force. An edit was introduced in 1991 which recoded full-time students, females aged 60 or older and males aged 65 or older who were originally given a Labour Force Status code of Not Stated to Not In the Labour Force. The coding of Labour Force Status is discussed further in Section 2.

These changes in coding procedures may have affected the final Census counts, making it difficult to determine how much of the changes in the Census counts between 1986 and 1991 are due to economic and social changes in the community, such as rising unemployment.

1991 Census Results

According to the 1991 Census, on Census night, 6 August 1991, there were 7,109,336 employed persons aged 15 and over and 931,646 unemployed persons in Australia. They

constituted Australia's labour force of 8,040,982 persons. 4,736,312 persons aged 15 and over were classified as Not In the Labour Force.

Table 1 shows the number of persons aged 15 and over by Labour Force Status for the 1986 and 1991 Censuses.

Table 1: Labour Force Status of persons aged 15 and over, 1986 and 1991 Censuses, Australia

Labour Force Status	1986 Census No.	1991 Census No.	Difference No.
Wage/salary earner	5,401,432	5,807,575	406,143
Self employed (employing others)	651,234	753,489	102,255
Self employed (not employing others)	400,159	485,727	85,568
Unpaid helper	60,690	62,545	1,855
Total employed	6,513,515	7,109,336	595,821
Looking for full-time work	527,258	750,101	222,843
Looking for part-time work	135,890	181,545	45,655
Total unemployed	663,148	931,646	268,498
Total labour force	7,176,663	8,040,982	864,319
In labour force	7,176,663	8,040,982	864,319
Not in labour force	4,533,847	4,736,312	202,465
Not stated*	254,801	308,358	53,557
Total persons aged 15 and over	11,965,311	13,085,652	1,120,341

* Persons aged 15 and over for whom Labour Force Status could not be derived.

Table 1 shows that the number of persons increased across all categories between 1986 and 1991. The differences between the categories are revealed when looking at proportional

changes. These changes are shown in Table 2.

Table 2: Percentage distribution by Labour Force Status, persons aged 15 and over, 1986 and 1991 Censuses, Australia

Labour Force Status	1986 Census %	1991 Census %	Difference %
Wage/salary earner	75.3	72.2	-3.1
Self employed (employing others)	9.1	9.4	0.3
Self employed (not employing others)	5.6	6.0	0.4
Unpaid helper	0.8	0.8	0.0
Total employed	90.8	88.4	-2.4
Looking for full-time work	7.3	9.3	2.0
Looking for part-time work	1.9	2.3	0.4
Total unemployed (Unemployment rate)	9.2	11.6	2.4
Total labour force	100.0	100.0	100.0
In labour force (Participation rate)	60.0	61.4	1.4
Not in labour force	37.9	36.2	-1.7
Not stated*	2.1	2.4	0.3
Total persons aged 15 and over	100.0	100.0	100.0

* Proportion of people aged 15 and over for whom Labour Force Status could not be derived.

The labour force participation rate (ie. the proportion of persons aged 15 and over who were classified to be in the labour force) as measured on Census night was 61.4 per cent, an increase of 1.4 percentage points over the 1986 Census participation rate.

The proportion of employed persons decreased from over 90 per cent in 1986 to 88.6 per cent in 1991. This was due to a large decrease (3.1 percentage points) in the proportion of persons employed as wage/salary earners, whereas the proportion of self-employed persons rose slightly over this period.

There was a noticeable increase (2.4%) in the proportion of the labour force who were unemployed persons. They constituted 11.6 per cent of the labour force in the 1991 Census. Most of the increase was in respect of people in the labour force looking for full-time, rather than part-time, work. This increase was also evident from the Labour Force Survey.

The non-response rate for the labour force status variable (ie. the proportion of people for whom a labour force status could not be determined) rose only slightly from 2.1 per cent to 2.4 per cent in the 1991 Census. See Section 3 for details on the non-response rate.

While the changes in the Census counts between 1986 and 1991 are likely to be largely due to changes in society and the economy, they may also be due, in part, to changes in coding procedures and other aspects of form design and the collection of data. These latter factors will be investigated further in the following sections.

QUALITY OF THE LABOUR FORCE STATUS VARIABLE

Labour Force Status, as already mentioned, is a Census variable which was derived from a series of questions and thus its quality is dependent upon the quality of responses to those questions and the accuracy of the coding methodology. In this section, the methodology will be examined, followed by the extent of Not Stated codes assigned and the incidence of incomplete and inconsistent responses to the core questions.

Coding of Labour Force Status

1991 Census

There were three main phases in the coding, or derivation, of Labour Force Status in the 1991 Census. The first stage involved the initial derivation of Labour Force Status, based on five questions: Full/Part-time Job, Looked for Work, Job Last Week, Hours Worked and Travel to Work. The first three of these were the core questions, while the latter two were only referred to when the core questions did not provide sufficient information. Where none of the five questions were answered, a code of Not Stated was assigned. The derivation used a decision table, an outline of which is included in Appendix 2.

Following the initial derivation, an edit was run to recode people who had been coded as Not Stated and were probably not in the labour force (women aged 60 years and older, men aged 65 years and older and full-time students) to Not In the Labour Force. Next, in the final stage of processing, people who had been coded as Employed or Not Stated but who gave non-market occupations (housewives/husbands, students and pensioners), which were considered to be out of scope, were recoded as Not In the Labour Force. Out of scope codes were only assigned when the information provided, including information on tasks and duties, indicated that the person was not in the labour force. Thus, a farmer's wife who indicated some tasks, other than housework, to do with work on the farm would have been retained in the employed labour force. These two edits are also detailed in Appendix 2.

1986 Census

In 1986, the derivation of Labour Force Status followed a similar process but with greater clerical involvement. The initial derivation of Labour Force Status was largely automated and based on the three questions Full/Part Time Job, Looked for Work and Job Last Week. The derivation table was similar to that used in 1991 although there were a few differences. If the core questions did not provide sufficient information for Labour Force Status to be derived, then a coder would try to determine the labour force using the actual Census form. If it was still not possible to derive the labour force status, a code of Not Stated was assigned.

An edit identified people who were coded as employed but who were not coded for the remaining labour force questions, including Occupation and Industry. The Labour Force Status for these people was determined by coders using the following guidelines:

- Inmates of detention or mental institutions who worked only within the institution were recoded to Not In the Labour Force
- Wives of farmers who actually worked at farming (which was determined from their and their husband's responses) were retained in the employed labour force but if there was no evidence that they worked on the farm, they were recoded as Not In the Labour Force
- Wives in business with their husbands who were shopkeepers, service station proprietors, restaurant/cafe proprietors, hotelkeepers or in other occupations in which they were self-employed or employers were retained in the employed labour force
- People who stated their occupation as full-time students or pensioners were assigned a labour force status of Not In the Labour Force unless their responses to occupation or industry indicated that they also had a 'market occupation'

Comparison of 1986 and 1991

There were several differences between the derivation tables used in 1986 and 1991. In 1986, difficult combinations were resolved by coders while in 1991 the process was fully automated and used two questions in addition to the three core questions. The effect of these changes is not possible to quantify.

There were also some changes in the derivations that would have lead to different codes being assigned for some people. The changes that affected the coding of people to the main Labour Force Status categories are shown in Appendix 2. Where incomplete or inconsistent information was given, a judgement had to be made as to what weight to give to the different questions. Although most codes would have been the same in the two censuses, some people who would have been coded as Not in the Labour Force using the 1986 table were coded Employed in 1991, while others who would have been coded as Employed in 1986 were coded Unemployed or Not in the Labour Force. Some combinations of responses which were resolved automatically in 1991 were referred to coders in 1986. Most of these cases had no response to Job Last Week.

Although the same principle was used in editing in both 1986 and 1991, that is, people were to be recoded from Employed to Not In the Labour Force only if there was no evidence that they were in the labour force, there would have been some differences in the codes assigned. It is difficult to predict the actual effect of these differences on the final counts. The count of Not Stateds would probably be affected by the introduction, in 1991, of the recode of Not Stated codes to Not In the Labour Force for women over 59, men over 64 and full-time students, even though the age and sex of persons and whether they were students were factors taken into account by the coders in 1986. The non-response rates for 1986 and 1991 are examined in more detail below.

Labour Force Status non-response rates

In the 1991 Census 308,358 codes of Not Stated to Labour Force Status were assigned. This represents 2.4 per cent of the applicable population (persons aged 15 and over). Not Stated codes for the 1986 and 1991 Censuses are shown in Table 3.

TABLE 3: Labour Force Status non-response rates, 1986 and 1991 Censuses, Australia

1986 Census

1991 Census

LFS variable	Number	%	Number	%
Not stated codes	254,801	2.1	308,358	2.4
Total persons 15 and over	11,965,311	100.0	13,085,652	100.0

Not Stated codes were assigned where no responses were provided to the core questions and where Labour Force Status could not be derived using other information. As discussed above, it is difficult to compare 1986 and 1991 non-response rates due to the changes in the processing procedures. Although the introduction of the recode mentioned above in 1991 may have been expected to reduce the non-response rate, the 1991 Census non-response rate for Labour Force Status (2.4%) is slightly higher than that for the 1986 Census (2.1%). However, the rates are reasonably similar and the difference is more likely to reflect procedural changes between 1986 and 1991 than any serious deterioration in the level of response to the relevant questions.

Effect of dummy records on the Non-response rate

Dummy forms are created for dwellings from which Census collectors could not obtain a Census form. Collectors were instructed to record a count of males and females for these dwellings if known. If there was no count person records were imputed on the basis of data for the rest of the Collector's District. Age, Sex, State of Usual Residence and Marital Status were imputed for persons on dummy forms with all other fields being set to Not Stated or not applicable.

In the 1991 Census, 202,742 persons were imputed on dummy forms which represents 1.2 per cent of the total Census person count. Previous analyses of the effect of dummy records on non-response rates for particular variables (eg. in **1991 Census Data Quality : Aboriginal and Torres Strait Islander counts**, Census Working Paper 93/6) have shown that up to 50 per cent of Not Stated codes originate from dummy records. The impact of dummy records on 1991 Census Labour Force Status Not Stated codes is demonstrated in the following table.

TABLE 4: Effect of dummy records on Labour Force Status Not Stated codes, 1991 Census

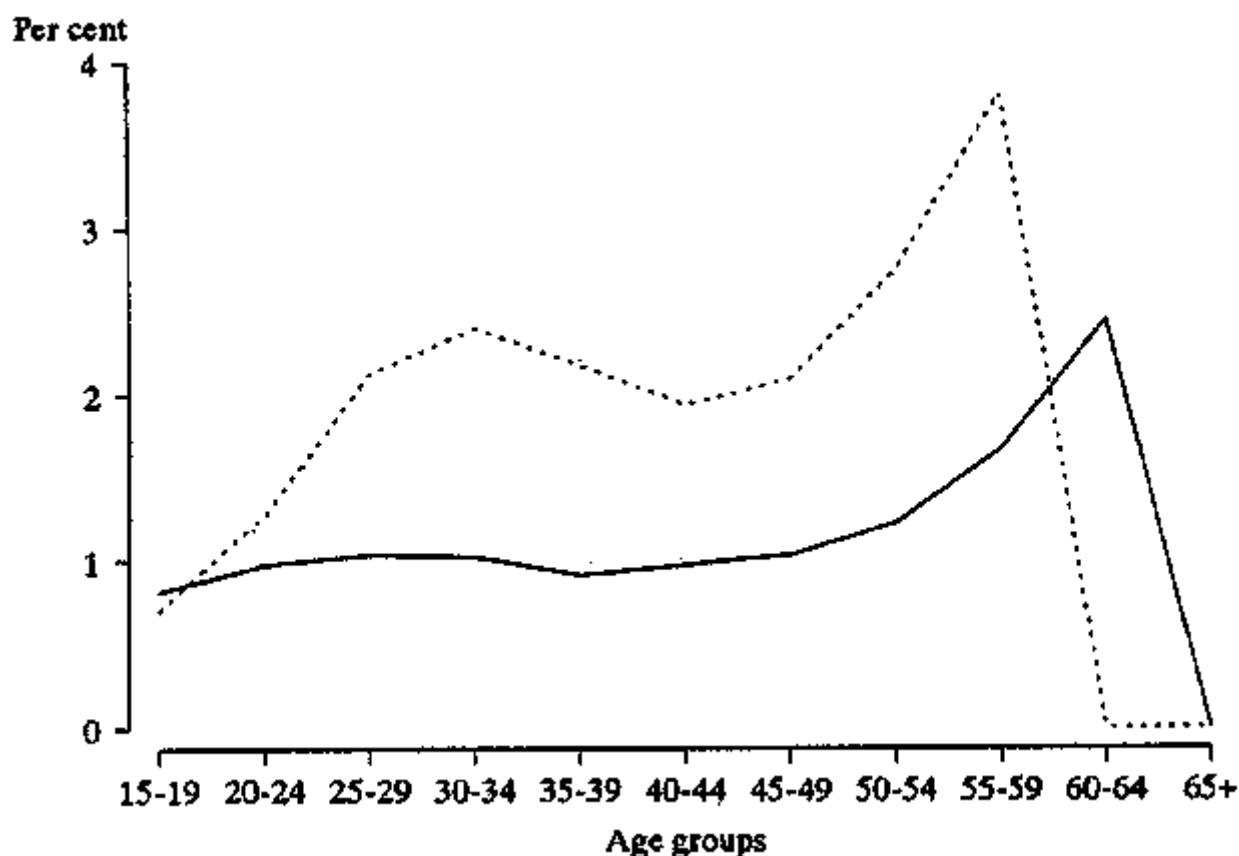
Response	Count	Per cent
Stated	12,777,294	97.6
Not Stated		
Dummy record	134,691	1.0
Other	173,667	1.3
Total Not Stated	308,358	2.4
Total persons 15 and over	13,085,652	100.0

When dummy records are excluded, the number of Not Stated codes is reduced by almost half. The remaining non-response rate for Labour Force Status is a relatively low 1.3 per cent. As the total number of dummy records 1991 was over double that in 1986, this indicates that there were fewer Not Stated codes allocated to non-dummy records in 1991. However, the increasing number of dummy records is itself of concern for data quality as it affects every question on the form.

Characteristics of persons for whom a Labour Force Status of Not Stated was assigned

The exclusion of dummy records better enables an analysis of the characteristics of persons for whom a Labour Force Status of Not Stated was assigned. The following graph (Figure 1) shows the distribution of Not Stated codes for the Labour Force Status variable by age and sex. The fact that there are no Not Stated codes for females 60 and over and males 65 and over is a result of edits mentioned earlier.

FIGURE 1: Distribution of Labour Force Status Not Stated codes by age and sex, 1991 Census



The graph shows the following results:

- With the exception of the 15-19 year age group, non-response rates are higher for females than males (about twice as high in most age-groups).
- Non-response rates are higher for the older age groups (particularly 50 years and older for females and 55 years and older for males). For females,

non-response rates are also relatively high in the 'child-bearing age-groups' (25-39_ these groups all have relatively slow participation rates.

The incidence of Not Stated codes will be examined further in Section 3.2

Response patterns to the core labour force questions

Examination of the patterns of responses to the core questions used in the derivation of Labour Force Status is useful in assessing the quality of the Labour Force Status variable. These questions are not stored on the final unit record file so in this section data from an earlier version of the Census unit record file, the Interim Final Unit Record File (IFURF) is used to enable such an analysis. As some changes were made between this version and the final version of the Census file, there will be some differences between these totals and those in Section 1.

The patterns of responses were divided into three groups for Table 5 overleaf. A more detailed table containing all response combinations is included in Appendix 3. People for whom responses were provided for all appropriate questions as directed by the sequencing instructions are classed as 'Complete and Consistent'. A response to Full/Part-time Job should have been given for all people over 15 years. People who indicated they were employed should then have responded to the question concerning their Job Last Week, while those who were not employed should have answered the question on Looked For Work.

The second group is entitled 'Commission error' (as distinct from omission error, that is, non-response) and occurred when a question was answered unnecessarily. The most frequent instance of this was for people coded as 'Employed' answering the Looked for Work question. Also, some people who did not have a job and answered the Looked for Work question then unnecessarily answered the Job Last Week question. Apart from people who had responses of No to Full/Part-time Job, Yes to Looking for Work and 'A helper not receiving wages or salary' (some of whom were coded to Not in the Labour Force rather than Unemployed), over-response did not affect the codes allocated or data quality. It does, however, increase respondent burden as extra questions are answered and can cause confusion, especially if the wrong sequencing instructions are followed.

All other combinations of responses were, in some way, 'Incomplete or Inconsistent'. The most common types are listed separately in the Table 5. Another type of error which has been discussed was for people who gave details of occupations which were considered non-market occupations, such as housewife, and were out of scope for the purposes of labour force estimates. The responses of these people could have been in any of the other three categories but they are identified separately in the table below as having 'Non-market occupations'.

In all, Table 5 shows that 76 per cent of responses were complete and correct and the derivation of a labour force status was straightforward. Another 12 per cent of responses involved commission errors which did not affect the derivation of Labour Force Status. However, over 11 per cent of records contained incomplete or inconsistent responses, and the derivation of Labour Force Status for these was, to some extent, less clear. The proportion of people giving non-market occupations was quite low at 0.4 per cent.

TABLE 5: Patterns of responses to core labour force questions, 1991 Census, IFURF, Australia

Response	Derived Labour Force Status				Total a
	Employed	Unemployed	Labour Force	Not Stated	
Status					

Complete and consistent	5,301,391	869,659	3,791,081	0	9,962,131
Commission error	1,400,057	19,485	163,082	0	1,582,624
Incomplete or inconsistent					
Error 1 b	213,714	9,354	581	0	223,649
Error 2 b	0	0	323,086	0	323,086
Error 3 b	27,309	1,011	331,377	305,838	665,535
Other	166,951	32,151	81,921	0	281,023
Total	407,974	42,516	736,965	305,838	1,493,293
Non-market occupation	0	0	46,333	0	46,333
Total persons aged 15 and over	7,109,422	931,660	4,737,461	305,838	13,084,381
		PERCENT			
Complete and consistent	74.57	93.35	80.02	.	76.14
Commission error	19.69	2.09	3.44	.	12.10
Incomplete or inconsistent					
Error 1 b	3.01	1.00	0.01	.	1.71
Error 2 b	.	.	6.82	.	2.47
Error 3 b	0.38	0.11	6.99	100.00	5.09
Other	2.35	3.45	1.73	.	2.15
Total	5.74	4.56	15.56	100.00	11.41
Non-market occupation	.	.	0.98		0.35
Total persons aged 15 and over	100.00	100.00	100.00	100.00	100.00

a excludes people aged 15 years or older but erroneously coded as Not Applicable on the IFURF (0.01% of total); differs from the total on the final Census file because of later amendments

b Error 1: Response of 'Yes' (1-3) to Full/Part-time Job, stated (1-3) to Looked For Work, Not Stated for Job Last Week

Error 2: Response of 'No' (4-5) to Full/Part-time Job, Not Stated for Looked For Work and Job Last Week

Error 3: Not Stated for Full/Part-time Job, Looked For Work and Job Last Week

Of persons with incomplete or inconsistent responses, 45 per cent did not have responses for any of the three core questions (Error 3 in Table 5). Almost half of these people were coded to 'Not In the Labour Force'. The questions on labour force may have been seen as

irrelevant to them. Some people who did not respond to the core questions were coded as 'Employed' or 'Unemployed' on the basis of other information, while for others there was insufficient information for a Labour Force Status to be derived and a code of Not Stated was assigned. Many of these records coded as Not Stated would have been on dummy forms. The decision table used in assigning codes is included in Appendix 2.

Another common error was to give a response of 'No' to the question on Full/Part-time Job but not answer the question on Looked For Work (Error 2). These people were coded to 'Not In the Labour Force'. Again it seems likely that these people were Not In the Labour Force and so the remaining questions, including Looked For Work, may have appeared irrelevant to them.

The sequencing instructions were not followed correctly for some employed people. After responding 'Yes' to Full/Part-time Job but not following the sequencing instruction, a response was given to the Looked for Work question and, following that sequencing instruction, all the remaining labour force questions, including Occupation and Industry, were skipped. This was done by 146,081 people (65% of those classed as 'Error 1'). They were all coded as 'Employed', but the failure to follow the sequencing instructions resulted in the loss of Job Last Week, Occupation and Industry data which were coded to Not Stated. Thus, part of the non-response rates for the later questions resulted not from problems with those questions but from difficulties with earlier sequencing instructions.

The responses to the Occupation questions for some people indicated that they had non-market occupations only and were not in the labour force, despite having answered the earlier questions as though they were employed. While Labour Force Status could be recoded for these people, there may have been others who had non-market occupations but could not be recoded as responses were not provided to the Occupation questions.

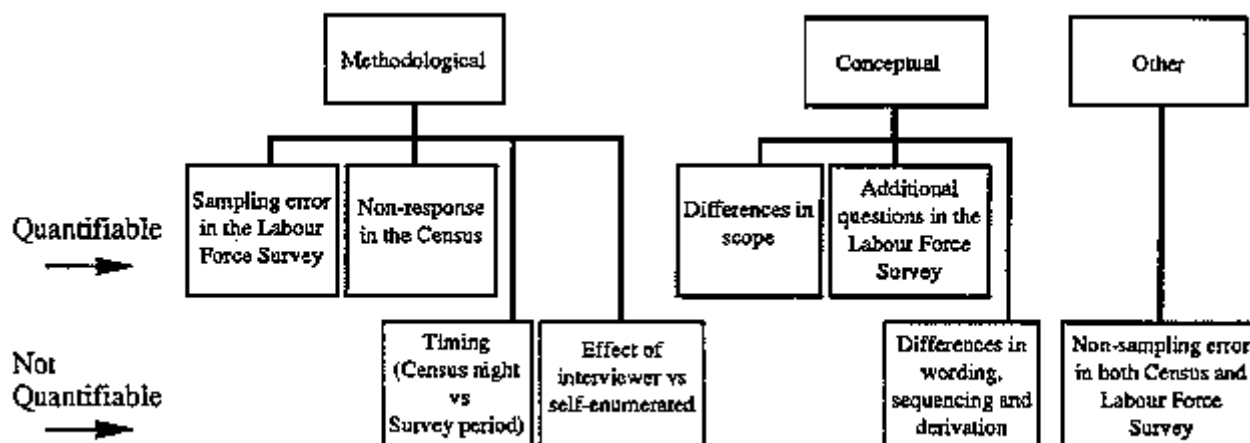
The series of labour force questions is a complex part of the Census form, causing problems for many respondents, as can be seen by over one-tenth of responses being incomplete or incorrect. Some of the errors may be the result of the apparent irrelevance of some questions, while others may result from genuine confusion. However, it is reassuring that almost 90 per cent of the data appears to be of good quality and that many of the apparent errors made can be rectified by later processing.

RECONCILIATION WITH LABOUR FORCE SURVEY DATA

Monthly estimates of the labour force are produced from the Labour Force Survey. In August 1991, over 71,000 people were included in this survey which comprises a questionnaire of 88 questions completed by interview. The counts from the survey were weighted to produce estimates of the labour force. As the estimates are obtained from a sample of the population, they are subject to sampling error.

There are a number of differences between the Census counts and the Labour Force Survey estimates. They arise from differences in methodology, in the concepts underlying the data and from non-sampling error in both collections, that is, error arising from respondent error or errors in collection or processing. Some of these differences are quantifiable but others are not. Adjustments can be made for most of the quantifiable differences (the exception being sampling error, which is examined below) however, as not all differences can be adjusted for, a perfect reconciliation is never possible. The main differences and whether they were quantifiable are illustrated in Figure 2 below.

FIGURE 2: Sources of difference between the Census and Labour Force Survey



One of the sources of difference arises from the fact that the estimates from the Labour Force Survey are subject to standard error. This can be estimated and the publication of the final estimates from the Labour Force Survey (ABS Cat. No. 6203.0) contains tables of standard errors. For example, an estimate of 5,000,000 for the employed population would be subject to a standard error of 19,700, that is 0.4 per cent. This means that there is a 95 per cent chance that the actual estimate is between 4,960,600 and 5,039,400. That is, if the Census result, adjusted for other differences, is between the two values, the difference is not significant.

Examining the extent to which the differences are due to known, quantifiable sources can improve the usefulness of Census data and highlight any possible problems if the remaining differences are great. In particular, as a part of performing the reconciliation, information was obtained on the nature of non-response in the Census. Comparison of the figures is also useful for the development of the 1996 Census form as additional questions, similar to ones asked in the Labour Force Survey, are being considered for inclusion to improve the comparability of the results. This will be discussed further in Section 4.

Initial adjustment procedures

A number of adjustments are made to the Census counts and Survey estimates in order to remove some of the known, quantifiable differences between the two collections. These adjustments and the effect of the Not Stated count in the Census are explained in more detail in Appendix 4.

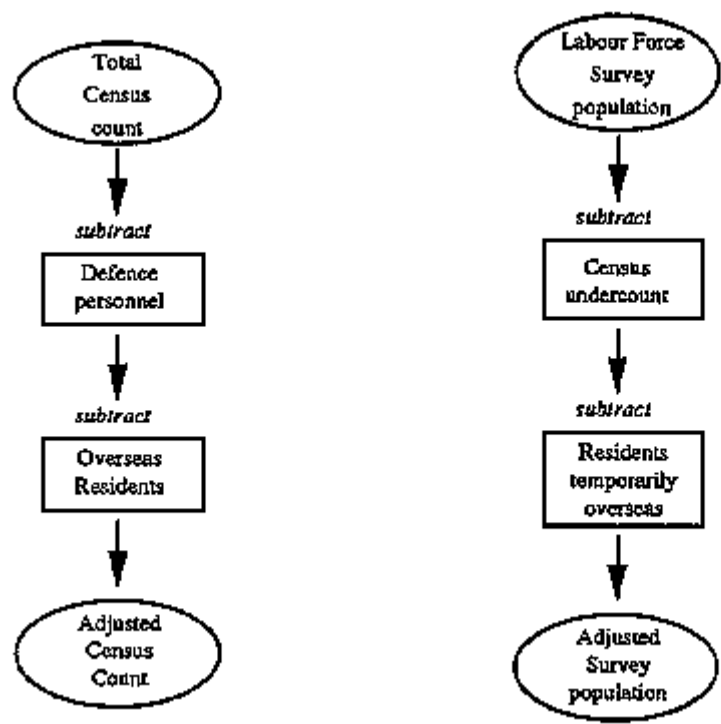
Adjustments for differences in scope

The scope of the Census covers everyone in Australia on Census night, with the exception of diplomatic personnel and their families. The scope of the Labour Force Survey excludes, in addition to these, members of the defence forces and persons usually resident overseas. The total population for the estimates produced from the Labour Force Survey is based on the Estimated Resident Population, adjusted to exclude people out of scope. The Estimated Resident Population is based on the Census count with adjustments made for births and deaths since Census night, for number of people estimated to have been missed in the Census (undercount), for residents temporarily overseas on Census night and to remove some of the variability between months. To improve comparability with the Census, these adjustments are reversed where possible, as shown in Figure 3 below.

The adjusted Census counts and Labour Force Survey population will not be the same due to the method used to estimate the population for the Labour Force Survey. This is explained in more detail in Appendix 4. However, the difference between the two totals is

reduced from 2.96% to 0.04%, so most of the difference is explained by these factors.

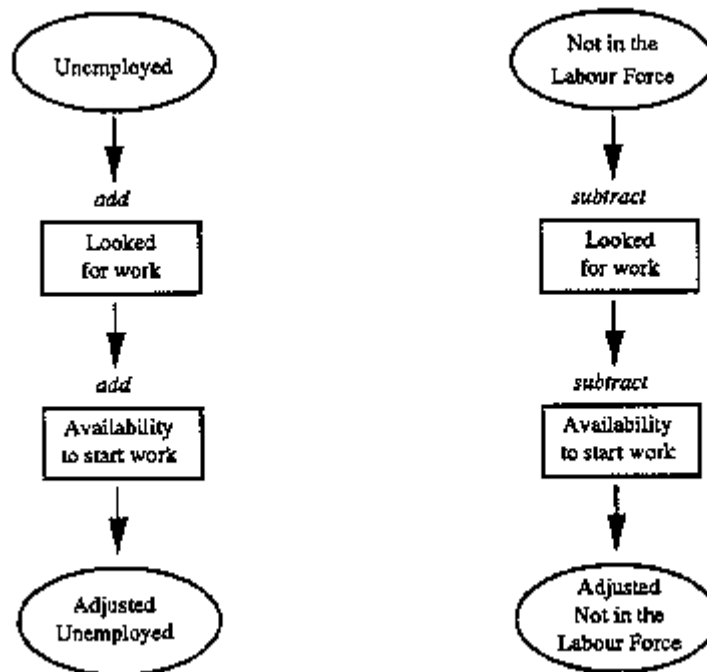
FIGURE 3: Adjustments made for differences in scope between the Census and Labour Force Survey



Adjustments for additional questions in the Labour Force Survey

Due to the different natures of the collections, the Labour Force Survey can contain more questions and more complex concepts than the Census. The Labour Force Survey questions are reproduced in Appendix 5. As a result, there are several conceptual differences for which adjustments can be made by removing the effect of the additional questions from the Labour Force Survey estimates. The differences involve two areas: firstly, whether a person is actively looking for work and, secondly, whether a person is available to start work. The differences between the collection would have resulted in some people who would have been classed as unemployed in the Census being classed as not in the labour force in the Labour Force Survey. These differences are explored further in Appendix 4. Adjustments were made to the estimates from the Labour Force Survey:

FIGURE 4: Adjustments made to Labour Force Survey estimates for additional questions



Not Stated codes in the Census

Another difference between the two collections is the presence of a Not Stated category in the Census. No such category is included in the Labour Force Survey data. As the Survey is completed by an interviewer rather than self-enumeration, response rates should be higher than the Census and any non-response in the Labour Force Survey is treated as sample loss and accounted for in the weighting of estimates. The impact of the non-response rate in the Census can be seen by comparing the adjusted figures for the Census and the Labour Force Survey.

TABLE 6: Effect of Not Stated codes in the Census on the comparison of August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status after adjustment for scope differences and additional Labour Force Survey questions

'000	Labour Force Status				Total
	Employed	Unemployed	Not in the Labour Force	Not Stated	
Census counts	7,017.6	929.3	4,699.6	302.7	12,949.1
Survey estimates	7,332.2	870.5	4,751.7	0	12,954.5
Difference	-314.7	58.8	-52.2	302.7	-5.4

The number of the Not Stated codes in the Census is great enough to have a large impact on the comparison of Census and Survey figures. An examination of the data by age and sex reveals much about the nature of non-response in the Census. The youngest age group, people aged 15 to 19 years, is analysed first as the response patterns are considerably different from those for the older age groups.

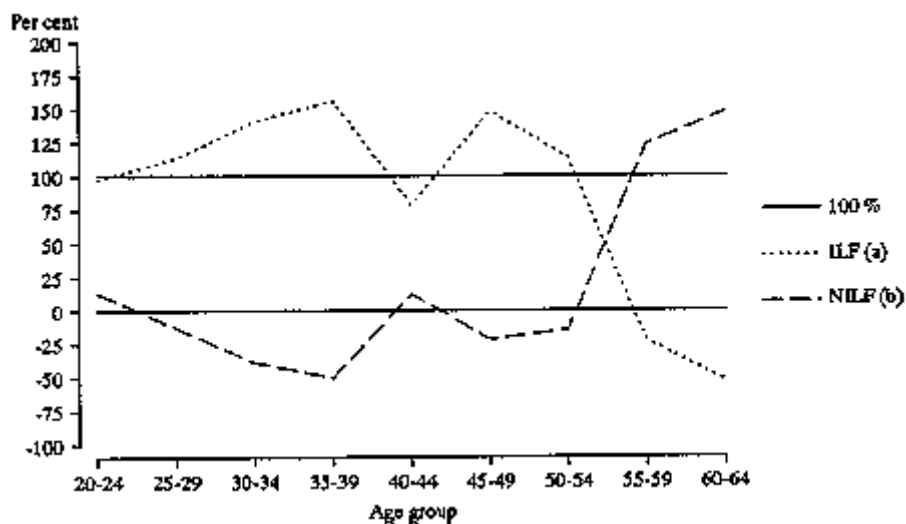
TABLE 7: Effect of Not Stated codes on the comparison of August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status after adjustment for scope differences and additional Labour Force Survey questions, persons aged between 15 and 19 years

'000	Census counts	Survey estimates	Difference
Employed	484.3	542.0	-50.9
Unemployed	147.6	171.9	-24.3
Total In Labour Force	631.8	713.9	-82.1
Not In the Labour Force	638.7	581.4	57.3
Not Stated	28.5	.	28.5
Total persons aged 15 to 19 years	1,299.0	1,295.3	3.7

The relative difference between the Census and Survey estimates of the labour force is very large for the age group 15 to 19 years when compared to the other age groups. Most people in this age group were full-time students, many with, or looking for, part time jobs. One possible reason for the differences observed could be that, in the Census, part-time jobs may not have been considered relevant for students as work is not their primary occupation. Thus the Census questions on labour force involvement may not have been answered or may have been answered as though the student was not in the labour force. In the Labour Force Survey, the interviewer should have been able to clarify the concepts involved and ensured that all jobs were included in the responses.

The trends in other age groups are very different. The broken lines in Figures 4 and 5 represent the differences between the Labour Force Survey estimates and Census counts of persons In the Labour Force (ILF) and Not in the Labour Force (NILF) as a percentage of the number of persons with a Not Stated code in the Census. Thus, if the percentage is around zero then there is little difference between the Survey estimates and Census counts, while if the percentage is around 100 then the difference between the Survey estimates and Census counts is about the same size as the number of Not Stateds. The older age groups (65 and over for men, 60 and over for women) are excluded as an edit reset Not Stated codes for these people to Not In the Labour Force.

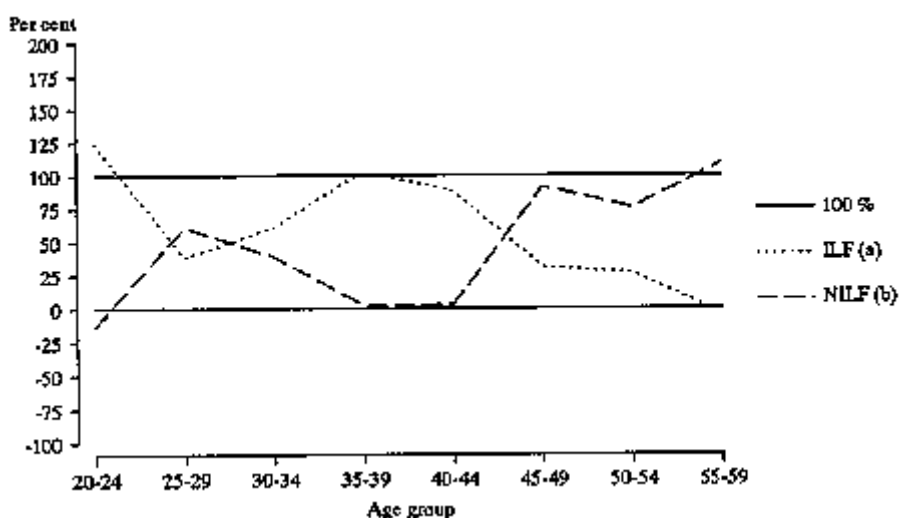
FIGURE 5: Differences between August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status as a percentage of Not Stateds in the Census after adjustment for scope differences and additional Labour Force Survey questions, males aged 20 years and over



a $(ILF(Survey) - ILF(Census)) / NS(Census)$
b $(NILF(Survey) - NILF(Census)) / NS(Census)$

Figure 4 shows that the ILF rate was, very roughly, around 100 per cent (and the NILF rate around 0) for most age groups, excepting those 55 years and over. That is, the difference between the Census counts and Labour Force Survey estimates of males in the Labour Force was around the same magnitude as the number of Not Stated codes assigned to males in the Census. This implies that it is likely that many of the males between 20 and 54 years for whom a Not Stated code was assigned in the Census were actually in the labour force. It is possible that these people felt reluctant to reveal information about their occupation or income. For the older age groups, where an increasing proportion of the population are not in the labour force, the NILF rate was around 100 per cent, while the ILF rate was around 0. Thus, most of these people would probably have not been in the labour force and they may not have responded in the Census as the questions seemed irrelevant.

FIGURE 6: Differences between August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status as a percentage of Not Stateds in the Census after adjustment for scope differences and additional Labour Force Survey questions, females aged 20 years and over



a $(ILF(Survey) - ILF(Census)) / NS(Census)$
b $(NILF(Survey) - NILF(Census)) / NS(Census)$

The pattern for females is more stable than that for males and is slightly different as many women leave the workforce temporarily to bear children. In the age groups of 25 to 34,

women both in and out of the labour force appear to contribute to the Not Stated count in the Census as both the ILF and NILF rates are around 50 per cent, while in other age groups, it is predominantly either women in the labour force (for women less than 45) or women not in the labour force (for women 45 or over) who appear to have been most likely to have been assigned a Not Stated code in the Census.

In summary, the likely Labour Force Status of non-respondents varies between age and sex groups. Although it is thought that much non-response is the result of people not answering questions that seem irrelevant to them, it appears that people both in the labour force and not in the labour force may fail to respond to the Census labour force questions.

Final Reconciliation of Census and Labour Force Survey data

Due to the large impact of the Not Stated category on the comparison of Census and Survey data, comparison of the other categories is difficult if the category is retained for the reconciliation. In order to be able to compare the other categories, the effect of the Not Stated category was excluded for the final reconciliation.

The adjustment for Not Stateds is explained further in Appendix 4. Note that the adjustment implicitly assumes that the distribution of Census non-respondents across Labour Force Status categories was the same as the distribution of respondents within each age, sex and State group. As the analysis in 3.2 shows, this assumption does not necessarily hold for particular sub-groups of the population.

Table 8 compares the Census counts and Labour Force Survey estimates after all of the possible adjustments have been made.

TABLE 8: Reconciliation of August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status after adjustment for scope differences, additional Labour Force Survey questions and Census Not Stated codes

	Labour Force Status		Not in the Labour Force	Total
	Employed	Unemployed Number ('000)		
Census counts	7,017.6	929.3	4,699.6	12,646.4
Survey estimates	7,135.4	847.8	4,668.5	12,651.8
Difference	-117.9	81.5	31.0	-5.4
Percentage	-1.7	8.8	0.7	-0.0
	Percentage distribution			
Census counts	55.5	7.3	37.2	100.0
Survey estimates	56.4	6.7	36.9	100.0
Difference	-0.9	0.6	0.3	
Rates				

Participation in the labour force

Census counts	62.8 (a)	37.2	100.0
Survey estimates	63.1 (a)	36.9	100.0

Status within the labour force

Census counts	88.3	11.7 (b)	..	100.0
Survey estimates	89.4	10.6 (b)	..	100.0

(a) Participation rate

(b) Unemployment rate

The figures from the Labour Force Survey and the Census differ by 1.7 per cent for the estimates of Employed and 0.7 per cent for Not In the Labour Force. The difference for the figures for Unemployed is relatively large at 8.8 per cent. The estimate of the participation rate is quite similar for the Labour Force Survey and the Census however the difference in the unemployment rate is greater, with the rate being over one per cent higher for the Census than the Labour Force Survey.

There are several possible causes of the remaining differences. Firstly, they could be in part the result of the approximations made in the adjustments, as explained in Appendix 4. Differences may also result from known but unquantifiable differences between the sources. These include the differences between the methodologies (the Labour Force Survey being completed by interview while the Census is self-enumerating), the slight differences in the timing (Census night was 6 August 1991, while the Labour Force Survey was conducted over a two week period early in August) and the effect of editing and imputation (particularly in the Census, see Section 2.1).

Data by State of Usual Residence are contained in Appendix 6. There was a great deal of variation between States, although some consistent trends did emerge. For males in all States except South Australia, the Labour Force Survey estimate of Employed was greater than the Census count, while the opposite was true for Unemployed and Not In the Labour Force. In South Australia, the Labour Force Status estimate of Not In the Labour Force was greater than the Census count. The differences between the Census counts and the Labour Force Survey estimates tended to be smaller and more varied for females.

Analysis by age and sex revealed some interesting results. Unemployment and Participation Rates by Age and Sex are included in Table 9.

TABLE 9: Reconciliation of August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status after adjustment for scope differences, additional Labour Force Survey questions and Census Not Stated codes, by age and sex

Age group				
15 to 19	20 to 24	25 to 34	35 to 49	50 and

	years	years	years	years	older	Total
	Participation Rate					
Census						
Males	50.0	87.9	94.1	93.2	45.9	73.8
Females	49.4	77.4	67.5	71.8	20.9	52.2
Persons	49.7	82.6	80.7	82.5	32.6	62.8
Labour Force Survey						
Males	55.9	87.9	94.9	93.7	44.7	74.4
Females	54.4	78.4	66.9	71.8	19.3	52.2
Persons	55.1	83.1	80.8	82.8	31.2	63.1
Difference						
Males	-5.9	0.0	-0.8	-0.5	1.2	-0.6
Females	-5.0	-1.0	0.6	0.0	1.6	0.0
Persons	-5.4	-0.5	-0.1	-0.3	1.4	-0.3
	Unemployment Rate					
Census						
Males	24.3	19.9	12.7	8.6	10.4	12.5
Females	22.4	15.3	10.3	7.3	6.8	10.6
Persons	23.4	17.7	11.6	8.1	9.2	11.7
Labour Force Survey						
Males	25.4	17.2	10.4	7.3	8.6	11.0
Females	22.6	14.5	9.4	6.9	5.7	10.1
Persons	24.1	15.9	10.0	7.2	7.6	10.6
Difference						
Males	-1.1	2.7	2.3	1.3	1.8	1.5
Females	-0.2	0.8	0.9	0.4	1.1	0.5
Persons	-0.7	1.8	1.6	0.9	1.6	1.1

Again, the differences tended to be greater for males than females. The difference between Census and Labour Force Survey estimates of the Participation Rate was greatest for the age group 15 to 19 years. This was also the only age group for which the Labour Force Survey estimate of the Unemployment Rate was greater than the estimate from the Census and was noted in Section 3.2 on non-response to show different patterns to the other age groups. It appears that labour market involvement, particularly looking for work, was under-reported in the Census for people aged between 15 and 19 years. As a large proportion of people in this age group were still studying full-time, it seems possible that they did not see their work or search for work as being relevant, although in the Labour Force Survey the interviewer should have been able to ensure that it was included.

Census and Labour Force Survey estimates of the Participation Rates were relatively close for other age groups with the exception of the oldest age group considered, 50 years and older. The Census estimate of the Participation Rates for this age group was greater than the Labour Force Survey estimates. As many people in this age group are involved in unpaid voluntary work, one possible reason may be the erroneous reporting of such work.

The Census estimate of the Unemployment Rate was consistently higher than the Labour Force Survey estimate for people aged 20 years and older. This could be due to an under-reporting of work in the Census, that is, although jobs of one hour a week or more should have been included, some people who were looking for work may not have reported employment of a few hours a week. This would have been less likely to occur in the interviewer-based Labour Force Survey.

Finally, it is possible to compare the reconciliation performed for the 1991 Census with that performed for the 1986 Census. Some adjustments must be made to both reconciliations so that they are comparable. These are outlined in Appendix 4. Table 10 below shows the Participation and Unemployment rates for the (adjusted) reconciliations in 1986 and 1991.

TABLE 10: Reconciliation of Labour Force Survey estimates and Census counts for Labour Force Status after adjustment for scope differences, the Availability to Start Work question and Census Not Stated codes, July 1986 and August 1991

	1986	1991
Participation Rate		
Census	61.2	62.8
Survey	61.9	62.6
Difference	-0.7	0.2
Unemployment Rate		
Census	9.3	11.7
Survey	8.4	9.9
Difference	0.9	1.8

In both 1986 and 1991 the Census estimate of the unemployment rate was larger than the Labour Force Survey estimate although the magnitude of the difference was greater in 1991. Census and Labour Force Survey estimates of the participation rate were closer in 1991.

After adjusting the 1991 Census count and August 1991 Labour Force Survey estimates for a number of known, quantifiable differences, the participation rates from the two sources are quite similar while the unemployment rate is greater in the Census than the Labour Force Survey. This pattern varies between age and sex groups, reflecting to some extent the differences in the participation in the labour force between these groups. There is also considerable variation between the States and Territories, which is more difficult to explain. It appears that the remaining differences are most likely due to the different nature of the two collections, the Census relying on self-enumeration while the Labour Force Survey is interviewer-based.

One of the differences between the collections for which an adjustment has been made in this reconciliation is the inclusion of questions about Availability to Start Work in the Labour Force Survey but not in the Census. The impact of these questions on the comparison of Census and Labour Force Survey data is examined in the next section.

SOME POSSIBLE CHANGES FOR THE 1996 CENSUS TO IMPROVE COMPARABILITY WITH THE LABOUR FORCE SURVEY

Some of the conceptual differences between the Census and the Labour Force Survey are due to the Labour Force Survey obtaining some information not asked for in the Census. Thus, the comparability of the two collections could be improved by including additional or more detailed questions in the Census. Two such changes are being considered for the 1991 Census:

- adding a question about Availability To Start Work for persons who are looking for work.
- identifying situations where persons working in their own business are actually employed by a Limited Liability company.

In this section, the data from the 1991 Census and the August 1991 Survey will be examined to try to determine the possible effect of each of the questions. The actual effect of including such questions in the Census will be slightly different as the questions asked on a self-enumeration form will be different to those in the Labour Force Survey, will be subject to non-response and will be completed without the assistance of the interviewer. However, including questions to remove conceptual differences between the collections should improve comparability.

Availability to start work

In the Labour Force Survey, people who did not work in the past week and looked for a job but were unavailable to start work would have been classified as Not In the Labour Force. No question on availability to start work was included in the Census and so such people would have been classified as Unemployed in the Census counts.

A question on availability to start work could considerably reduce the differences in the unadjusted labour force figures for unemployed between the Census and the corresponding Survey. Table 11 below indicates the possible effect of including the question in the Census.

TABLE 11: Effect of 'Availability to start work' question on the comparison of unadjusted August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status

	Labour Force Status				Total
	Employed	Unemployed	Not in the Labour Force	Not Stated	
Census counts	7,109,336	931,646	4,736,312	308,358	13,085,652
Survey estimates	7,631,658	798,280	5,029,369	0	13,459,307
Difference	-522,322	133,366	-293,057	308,358	-373,347
Effect of question	0	-39,073	39,073	0	0
a					
Percentage of difference	0.00	29.3	13.3	0.00	0.00

a number recoded by the Availability to Start Work question in the Labour Force Survey

In the August 1991 Labour Force Survey, an estimated 39,073 people who satisfied the rest of the criteria for Unemployed were not available to start work. Table 11 shows that almost a third of the differences between the Census and the Labour Force Survey figures for Unemployed are explained by the effect of this question.

While the impact of including a question on Availability to Start Work in the Census will not necessarily match this because of other differences in the design of the forms and in the collection methodology, such an addition will improve the comparability of the labour force data from the Census and the Labour Force Survey by removing one of the conceptual differences.

Limited liability

Most of this paper has been concerned with the broad labour force status categories of employed, unemployed and not in the labour force. The category of employed can be further divided up into wage and salary earners, self-employed and employing others, self-employed and not employing others and unpaid helper in a family business. Table 12 compares the unadjusted Labour Force Survey estimates and Census counts.

TABLE 12: Unadjusted August 1991 Labour Force Survey estimates and 1991 Census counts for Status of Worker of employed persons

	Status of Worker				Total employed
	W/S earner	Employing others	Not employing others	Unpaid family helper	
Census counts	5,807,575	485,727	753,489	62,545	7,109,336
Survey estimates	6,439,734	344,139	778,254	69,531	7,631,658
Difference	-632,159	141,588	-24,765	-6,986	-522,322
Percentage	-10.89	29.15	-3.29	-11.17	-7.35

There are considerable differences between the figures for wage and salary earners, self-employed employing others and unpaid family helpers, although the figures for self-employed not employing others are relatively close. To some extent, these differences are due to differences in scope between the collections and the presence of non-response in the Census. However, there is one other conceptual difference involving information collected in the Labour Force Survey on limited liability companies which would also have an influence on the comparison.

Information was obtained in the Labour Force Survey, but not in the 1991 Census, on whether people who were self-employed worked in a limited liability company or not. If they did work in a limited liability company, they were recoded from self-employed to wage or salary earners. Thus, it would be expected that the estimate of wage/salary earners in the Labour Force Survey would be higher than the Census count (which is the case in Table 11) and that the estimate of Self-employed would be lower than the Census count (which is the case only for those employing others).

In most months, the Labour Force Survey relies entirely on a direct question for information on whether a self-employed person works for a limited liability company or not. However, once every quarter an additional check against the business register is performed as it was found that the concept of a limited liability company is sometimes misunderstood by respondents. These checks are aimed at ensuring that the correction to the number of wage and salary earners is not overstated.

Although no information concerning limited liability companies was collected in the 1991 Census, some 'self-employed' people in limited liability companies may still have identified themselves as wage or salary earners anyway. An instruction was included in the Census Hotline Inquiry Guide as follows:

If you are a director of your own limited liability company (i.e. the company is incorporated), you are considered a salaried employee of that company. You should therefore mark the first box.

The level of difference between the Census counts and Labour Force Survey estimates, although not quite as expected, indicates that many people in limited liability companies did not identify themselves as wage or salary earners in the Census. An expanded question on Job Last Week, which would incorporate information on limited liability companies, is being considered for inclusion in the 1996 Census although it is not planned to check responses against the business register. The number of people recoded from self-employed to wage and salary earners due to the additional information collected in the Labour Force Survey in August 1991 is shown in Table 13.

TABLE 13: Effect of information collected in the Labour Force Survey on self-employed persons in limited liability companies on the difference between August

1991 Labour Force Survey estimates and 1991 Census counts for Status of Worker of employed persons

	W/S earner	Status of Worker			Total employed
		Employing others	Not employing others	Unpaid family helper	
Difference between Census and Labour Force Survey	-632,159	141,588	-24,765	-6,986	-522,322
Effect of question a	379,015	-254,078	-124,937	0	0
Effect of question and check b	339,926	-220,612	-119,314	0	0

a number recoded by the Limited Liability question in the Labour Force Survey

b number recoded by the Limited Liability question after the check against the business register

The effect of the question alone is to reduce the difference in the number of wage/salary earners between the Census and the Labour Force Survey. However, the effect on the estimates of self-employed people employing others is to change from the Census count being much larger than the Labour Force Survey estimate to being considerably smaller and the difference between estimates of self-employed not employing others changes from being very small to quite large.

When the effect of the business register check is included, the changes are smaller with about 10 per cent fewer people being recoded. This indicates that there was some misunderstanding of the meaning of limited liability. Thus, any adjustment in the 1996 Census on the basis of the additional information collected from a question, without a check against a business register, will probably be an over-adjustment.

It can be expected that asking whether people's own businesses are limited liability companies would reduce some of the difference between the Census and the Labour Force Survey for wage and salary earners but it is not likely to have much benefit for comparisons of data on the self-employed from the two sources. Other differences, due particularly to the different methodologies, may outweigh the impact of such conceptual improvement.

CONCLUSION

The information obtained in the Census on Labour Force Status is valuable in providing data for small groups of the population which cannot be obtained from the monthly Labour Force Survey. Within this paper, various aspects of the quality of the data have been examined using the Census data itself and comparison with data from the Labour Force Survey. The main conclusions of the analysis are summarised below:

Completeness of responses for persons aged 15 years and over

The series of questions on Labour Force Status constitute a complex part of the Census form and the overall quality of the data produced is dependent on the quality of responses to

these questions and the processing and derivation procedures used. Where information was missing or inconsistent, a value of Labour Force Status could usually be imputed. An examination of the patterns of responses to the labour force questions (see Section 2.3) revealed that:

- The data for almost 90 per cent of people was complete and consistent and therefore derivation of Labour Force Status was straightforward.
- Over 10 per cent of these people had answered some questions unnecessarily. For example, many employed people had unnecessarily answered the question concerning Looked for Work.
- Over 5 per cent of people had no responses to any of the core labour force questions. Over half of these people were eventually coded as Not In the Labour Force with most of the remainder being assigned a Not Stated code.
- Almost 2.5 per cent of people had a response of 'No' to the Full/Part-time Job question and then no response to any of the other questions. These people were finally coded as being Not In the Labour Force.

Thus, it appears that the responses provided to the Labour Force questions were of reasonably high quality, despite the complexity of the sequence of questions.

Non-response

The major concern for data quality is the number of persons for whom no responses were provided. The non-response rate for Labour Force Status represents the proportion of persons aged 15 years and over for whom a Labour Force Status could not be derived. The final non-response rate in 1991 was 2.4 per cent. This is slightly higher than the rate in 1986 of 2.1 per cent although it does not necessarily represent a deterioration in responses as the response rate was also affected by changes in processing procedures between the 1986 and 1991 Censuses.

More information on the characteristics of persons who were assigned Not Stated codes was obtained as a part of the reconciliation with Labour Force Survey data, as described below. The results of this analysis (see Section 3.2) appeared to suggest that:

- Many, perhaps most, of the males aged 20 to 54 years assigned a Not Stated code in the Census were probably in the labour force.
- Most males 55 and older and females 45 and older assigned a Not Stated code were probably not in the labour force.
- Females in the age range 25 to 34 years assigned a Not Stated code in the Census were likely to consist of equal proportions of people in the labour force and people not in the labour force.

The labour force questions may have appeared irrelevant to some people not in the labour force while some people in the labour force may have been unwilling to disclose details of their labour market involvement.

Comparison of 1991 Census and August 1991 Labour Force Survey data

There are several known differences in scope and definition between the data on Labour

Force Status collected in the Census and in the Labour Force Survey. Some of these differences can be adjusted for, however, enabling the comparison of Census and Labour Force Survey results. For the final reconciliation, adjustments were made for differences in scope, the additional questions in the Labour Force Survey and for Not Stated codes in the Census. The reconciliation (see Section 3.3) revealed that:

- The overall participation rate was very similar for the two sources.
- The differences in the participation rates tended to be larger in the youngest and oldest age groups, where a large proportion of the people were not in the labour force. For the age groups 15 to 19 years, the Census participation rates were lower than the Labour Force Survey rates. For the 50 years and older age groups, Census participation rates were higher.
- The overall unemployment rate was higher for the Census.
- By age group, Census unemployment rates were consistently higher than Labour Force Survey rates for all groups 20 years and over. But for 15 to 19 year olds, the Census unemployment rate was significantly lower than the Labour Force Survey rate.
- The differences for both participation and unemployment rates tended to be greater for males than females.
- There was some variation in the results of the reconciliation between States and Territories.

The differences remaining between the reconciled Census and Labour Force Survey figures may be because of differences arising from the different methods of collection as the Census relies on self-enumeration while the Labour Force Survey is conducted by interviewers. Thus, for example, while an interviewer may be able to ensure that people who worked one hour or more are classed as employed, in the Census people who worked for only a few hours may not have classed this as being employed.

Some of the known differences between the Census and the Labour Force Survey, for which adjustments could be made, arise from the inclusion of extra questions in the Labour Force Survey. Questions concerning two issues, availability to start work and the operation of limited liability companies by 'self-employed' people are being considered for inclusion in the Census. Comparison of 1991 Census and Labour Force Survey data (see Section 4) indicated that:

- The differences between the two sources should be reduced by the inclusion of a question on Availability to Start Work.
- The likely effect of asking in a Census whether self-employed people work in Limited Liability companies is less clear and may be outweighed by methodological differences that remain between the two collections.

Summary

Overall, given the complexity of the sequencing instructions for the labour force questions in the Census, the quality of responses appears satisfactory. Comparison with the Labour Force Survey data showed a reasonably close correspondence in the participation rates. However there were larger differences between the unemployment rates which could be reduced by the addition in future Censuses of an extra question asking about availability to start work.

APPENDIX 2: Decision table and edits for coding Labour Force Status, 1986 and 1991

A: 1991 Decision Table

Full/part-time job	Looked for work	Job last week	Hours worked	Travel to work	Derived LFS
1,2,3,NS	Any	1,2,3	Any	Any	Employed
1,2,3	Any	4	Any	Any	Employed
1,2,3	1,NS	NS	Any	Any	Employed
1,3	2,3	NS	----At least one stated----		Employed
2	2,3	NS	Std,NS	Std	Employed
2	2,3	NS	Std	NS	Emp/Unemp
1	2,3	NS	NS		Unemployed
2,3	2,3	NS	NS	NS	Emp/Unemp
4,5	1,NS	NS	Any	Any	NILF
4,5	2,3	NS	Any	Any	Unemployed
4,5	1	1,2,3	Any	Any	NILF
4,5	2,3	1,2,3	Any	Any	Unemployed
4,5	NS	1,2,3	----At least one stated----		Employed
4,5	NS	1,2,3	NS	NS	Unemp/NILF
4,5,NS	1	4	Any	Any	NILF
4,5,NS	2	4	Any	Any	Unemployed
4,5	3,NS	4	Any	Any	Unemp/NILF
NS	3	4	Any	Any	Unemployed
NS	NS	4	Any	Any	Employed
NS	1	NS	Any	Any	NILF
NS	2,3	NS	----At least one stated----		Employed
NS	2,3	NS	NS	NS	Unemployed
NS	NS	NS	1,NS	1-9,11	Not Stated
NS	NS	NS	1	10,12,NS	NILF
NS	NS	NS	>1	1-9,11	Employed
NS	NS	NS	>1	10,12,NS	Not Stated
NS	NS	NS	NS	10,12	NILF
NS	NS	NS	NS	NS	Not Stated

NS

Not Stated

Std

Stated response

Any

Stated or no response

NILF

Not in the Labour Force

Full/part time job:

1=Had a job, 2=Had a job but absent, 3=Unpaid work in a family business, 4=Other unpaid work, 5=No

Looked for work:

1=No, 2=Yes, full-time, 3=Yes, part-time

Job last week:

1,2,3=W/S earner or self-employed, 4=Unpaid helper

Hours worked:

1=None, >1=1 or more hours worked

Travel to work:

1-9,11=Method of travel stated, 10=Worked at home, 12=Did not go to work

B: 1991 Edits

Derived LFS	Age	Sex	Student Status	Occupation	Revised LFS
Not Stated	60 or older	Female	..	..	NILF
Not Stated	65 or older	Male	..	..	NILF
Not Stated	..	..	Full-time	..	NILF
Employed	..	..	..	Out of scope	NILF
Not Stated	..	..	..	Out of scope	NILF

C: Main differences in the decision table between 1986 and 1991

Full/part-time job	Looked for work	Job last week	Hours worked	Travel to work	1991 LFS	1986 LFS	Persons affected in 1991
4,5	NS	1,2,3	----At least one stated----	Employed	Employed	NILF	9,335
NS	1	4	Any	Any	NILF	Employed	1,555
NS	2,3	4	Any	Any	Unemp	Employed	399
1,2,3,NS	Any	NS	Any	Any	Emp/Unemp/	Referred to Unknown	
						NILF/NS	Coders

NS Not Stated

Any Stated or no response

NILF Not in the Labour Force

Full/part time job: 1=Had a job, 2=Had a job but absent, 3=Unpaid work in a family business, 4=Other unpaid work, 5=No

Looked for work: 1=No, 2=Yes, full-time, 3=Yes, part-time

Job last week: 1,2,3=W/S earner or self-employed, 4=Unpaid helper

Hours worked: 1=None, >1=1 or more hours worked

Travel to work: 1-9,11=Method of travel stated, 10=Worked at home, 12=Did not go to work

APPENDIX 3: Detailed response patterns to core labour force questions, 1991 Census, IFURF

Response Status			Derived Labour Force Status				Total a
Full/Part-time Job	Looked for Work	Job Last Week	Employed	Unemployed	Not in the Labour Force	Not Stated	
COUNT							
Complete and Consistent							
Yes	NS	Std	5,301,391	0	0	0	5,301,391
No	Yes	NS	0	869,659	0	0	869,659
No	No	NS	0	0	3,791,081	0	3,791,081
Sub-total			5,301,391	869,659	3,791,081	0	9,962,131

**Commission
error**

Yes	Std	Std	1,400,057	0	0	0	1,400,057
No	Yes	Std (1-3)	0	19,485	0	0	19,485
No	No	Std	0	0	163,082	0	163,082
Sub-total			1,400,057	19,485	163,082	0	1,582,624

**Incomplete or inconsistent (derived using
Hours Worked and Travel to Work)**

No	NS	Std (1-3)	9,335	175	1,090	0	10,600
Yes	Yes	NS	(Error 1) 7,312	9,354	0	0	16,666
NS	Yes	NS	3,815	6,727	0	0	10,542
NS	NS	NS	(Error 3) 27,309	1,011	331,377	305,838	665,535
Sub-total			47,771	17,267	332,467	305,838	703,343

**Incomplete or
inconsistent (remainder)**

No	Yes	Std (4)	0	21,234	9,184	0	30,418
No	NS	Std (4)	877	3,616	24,068	0	28,561
Yes	No	NS	(Error 1) 206,402	0	581	0	206,983
NS	No	NS	0	0	46,023	0	46,023
Yes	NS	NS	107,221	0	0	0	107,221
No	NS	NS	(Error 2) 0	0	323,086	0	323,086
NS	NS	Std	34,418	0	0		34,418
NS	Std	Std	11,285	399	1,556	0	13,240
Sub-total			360,203	25,249	404,498	0	789,950
Non-market occupation			0	0	46,333	0	46,333

**Total persons
aged 15 and
over**

7,109,422 931,660 4,737,461 305,838 13,084,381

PERCENT

**Complete and
Consistent**

Yes	NS	Std	74.57	.	.	.	40.52
No	Yes	NS	.	93.35	.	.	6.65
No	No	NS	.	.	80.02	.	28.97
Sub-total			74.57	93.35	80.02	.	76.14

**Commission
error**

Yes	Std	Std	19.69	.	.	.	10.70
No	Yes	Std (1-3)	.	2.09	.	.	0.15
No	No	Std	.	.	3.44	.	1.25
Sub-total			19.69	2.09	3.44	.	12.10

**Incomplete or inconsistent (derived using
Hours Worked and Travel to Work)**

No	NS	Std (1-3)	0.13	0.02	0.02	.	0.08
----	----	-----------	------	------	------	---	------

Yes	Yes	NS	(Error 1)	1.00	.	.	0.13
			0.10				
NS	Yes	NS	0.05	0.72	.	.	0.08
NS	NS	NS	(Error 3)	0.11	6.99	100.00	5.09
			0.38				
Sub-total			0.67	1.85	7.02	100.00	5.38
Incomplete or inconsistent (remainder)							
No	Yes	Std (4)	.	2.28	0.19	.	0.23
No	NS	Std (4)	0.01	0.39	0.51	.	0.22
Yes	No	NS	(Error 1)	.	0.01	.	1.58
			2.90				
NS	No	NS	.	.	0.97	.	0.35
Yes	NS	NS	1.51	.	.	.	0.82
No	NS	NS	(Error 2)	.	6.82	.	2.47
NS	NS	Std	0.48	.	.	.	0.26
NS	Std	Std	0.16	0.04	0.03	.	0.10
Sub-total			5.07	2.71	8.54	.	6.03
Non-market occupation				.	0.98	.	0.35
Total persons aged 15 and over			100.00	100.00	100.00	100.00	100.00

a excludes people aged 15 years or older but erroneously coded as Not Applicable on the IFURF (0.01% of total)

APPENDIX 4: Details of adjustments made for the reconciliation between Labour Force Survey estimates and Census counts

Census counts and Labour Force Survey estimates

Comparison of data on the labour force obtained from the 1991 Census counts and the August 1991 Labour Force Survey will show large discrepancies. There are a number of differences between the two collections and in this appendix those differences which are quantifiable will be examined and adjustments will be made to the Census and Labour Force Survey data.

While the Census data on the Labour Force represents counts of people enumerated in the Census, the data from the Labour Force Survey are obtained by weighting the responses of a sample of the population to a 'benchmark' figure obtained from the current population estimate. The benchmark for the August 1991 Labour Force Survey estimates was based on the 1991 Census count, adjusted for undercount in the Census and residents temporarily overseas, excluding people who are out of scope and smoothed to reduce monthly variation. Weights are calculated for 'benchmark cells' which are determined by age, sex and part of state of usual residence. In this analysis, some data were not available by part of state so the benchmark cells were by age, sex and state of usual residence. Thus, the data will differ from that published elsewhere.

There are three stages in the adjustments. Firstly, the Census counts and Labour Force Survey benchmarks must both be adjusted for differences in scope. Secondly, as additional questions are asked in the Labour Force Survey obtaining more detailed information, adjustments must be made to reverse the effect of these. The data after these two

adjustments was used in the analysis of Not Stated codes in Section 3.2.

Thirdly, a category of Not Stated is included in the Labour Force Status variable in the Census as some people do not answer the labour force questions. As such a category is not required in the Labour Force Survey, this group of people is subtracted from both the Census counts and the Labour Force Survey benchmarks to produce the final set of adjusted data.

Adjustment to Census for differences in scope

The Census covers all people present in Australia on Census night (except certain diplomatic personnel), while the scope of the Labour Force Survey is restricted to the civilian resident population. Thus, members of the defence forces and people usually resident overseas were excluded from the Census counts for the reconciliation.

As adequate information on the number of defence personnel counted in the Census is not available from either occupation or industry codes, counts supplied by the Department of Defence were used. All defence personnel were classed as employed.

This was an over-adjustment as inevitably some defence personnel would not have been counted in the Census and others may not have responded to the Census labour force questions.

TABLE A1: Adjustments made to 1991 Census counts for scope differences

'000	Derived Labour Force Status			Not Stated	Total
	Employed	Unemployed	Not In the Labour Force		
Unadjusted Census counts	7,109.3	931.6	4,736.3	308.4	13,085.7
Subtract:					
Overseas residents	23.2	2.4	36.7	5.7	68.0
Defence personnel	68.6	0	0	0	68.6
Adjusted Census counts	7,017.6	929.3	4,699.6	302.7	12,949.1

Adjustment to the Labour Force Survey for differences in scope

The benchmarks used in calculating the weights for the estimates from the Labour Force Survey are based on the population estimates, with adjustments made to exclude Defence personnel and smoothed to reduce monthly variation. The population estimates for August 1991 were based on 1991 Census counts, adjusted for undercount, usual residents overseas on Census night, and births, deaths and migration between Census night and the date for the estimates. To improve the comparability with the Census counts, the benchmarks were recalculated excluding the adjustments for undercount and residents temporarily overseas. As no adjustment is made for the smoothing, the benchmark will still differ from the Census total.

The weighting for Labour Force Survey estimates is done for 'benchmark cells' which are defined by Age, Sex and Part-of-state of usual residence. However, as mentioned earlier, for this reconciliation not all the required data was available on a part-of-state basis so benchmark cells of Age, Sex and State of usual residence were used. As a result the 'Unadjusted' estimates in this Appendix will differ from estimates for August 1991 published elsewhere.

TABLE A2: Adjustments made to August 1991 Labour Force Survey benchmarks for scope differences ('000)

Unadjusted benchmark	13,459.3
Subtract:	
Undercount	298.5
Residents temporarily overseas	206.3
Adjusted benchmark	12,954.5

Adjustment to the Labour Force Survey for additional questions

As the Labour Force Survey is an interviewer based survey devoted to accurate estimation of the labour force, the number and complexity of questions asked can be much greater than in the Census where there are many additional constraints. Among the extra questions included in the Labour Force Survey are questions concerning more detailed information on what activities were involved in looking for work and concerning availability to start work. A copy of the basic questions used in the Labour Force Survey is included in Appendix 5.

In both the Census and the Labour Force Survey, information was sought on whether people who did not have a job had looked for full-time or part-time work. In both collections a question was asked on whether the person looked for work. In the Labour Force Survey, however, an additional question on exactly what activities were involved is asked and, if a person had, for example, only looked in newspapers then they were classified as Not In the Labour Force. Questions were then asked for people who had satisfied the looked for work criteria about their availability to start work. To be classified as Unemployed, people must have been able to start work in the past week or satisfy other criteria. These criteria are: have been unable to work due to illness or injury which had lasted less than four weeks, or have been waiting to start a job within the next four weeks and had been available to start in the last week.

These additional questions resulted in people who would probably have been classified as Unemployed in the Census being classified as Not In the Labour Force in the Labour Force Survey. To improve the comparability of Census and Labour Force Survey data, people who were classified as Not In the Labour Force as a result of the additional questions in the Labour Force Survey were reclassified as Unemployed for the adjusted Labour Force Survey figures. The adjustment for the additional question on Looked for Work may be an over-adjustment as a list of activities involved in actively looking for work is included as a Census question. However, as it is not a separate question and it is possible that in the Census many people overlooked the list or did not read it thoroughly, an adjustment has been made for the full effect of this Labour Force Survey question. The effect of these changes is shown in Table A3.

TABLE A3: Adjustments made to August 1991 Labour Force Survey estimates, after adjustments for scope differences, for additional questions in the Labour Force Survey

'000	Labour Force Status	
	Unemployed	Not In Labour Force
Initial Labour Force Survey estimates	765.2	4,857.0

Add/Subtract:

Didn't satisfy the 'looked for work' criteria	+67.8	-67.8
Were unable to start work	+37.5	-37.5
Adjusted Labour Force Survey estimates	870.5	4,751.7

* based on benchmarks adjusted for differences in scope

Adjustment for Census Not Stated codes

A category of Not Stated was only included in the Census Labour Force Status variable as it is not possible to ensure data of sufficient quality to be able to derive a status for every person in the Census. Such a category was not required in the Labour Force Survey as any non-response was treated as sample loss and accounted for weighting procedure. In order to improve the comparability of results, this extra category was excluded from the Census, after an analysis of Not Stated codes had been performed, for the final reconciliation.

The exclusion of Not Stated codes was straightforward for the Census data however an adjustment also had to be made to the Labour Force Survey benchmarks to, in effect, make people who had been coded as Not Stated in the Census 'Out of scope' in the Labour Force Survey. This ensured that the population totals remained similar and a comparison of the categories was possible.

In effect, the exclusion of Not Stated codes from the Census counts on which the Labour Force Survey benchmarks were based assumed that the distribution between Labour Force Status categories is the same as the stated responses within each benchmark cell. While this is unlikely to be entirely accurate (see Section 3.2), it is a straightforward adjustment that allows a less distorted comparison of the remaining labour force categories between the Census and the Labour Force Survey.

The exclusion of Not Stated codes from the Census counts and, therefore, from the Labour Force Survey benchmarks required the recalculation of the adjustments discussed above. The recalculated results are in the tables below.

TABLE A4: Adjustments made to 1991 Census counts for scope differences and Census Not Stated codes

'000	Derived Labour Force Status			Not Stated	Total
	Employed	Unemployed	Not In the Labour Force		
Unadjusted Census counts	7,109.3	931.6	4,736.3	308.4	13,085.7
Subtract:					
Overseas residents	23.2	2.4	36.7	5.7	68.0
Defence personnel	68.6	0	0	0	68.6
Not Stated*	0	0	0	302.7	302.7
Adjusted Census counts	7,017.6	929.3	4,699.8	0	12,646.4

* Usual residents only

TABLE A5: Adjustments made to August 1991 Labour Force Survey benchmarks for

scope differences and Census Not Stated codes ('000)

Unadjusted benchmark	13,459.3
Subtract:	
Undercount	298.5
Residents temporarily overseas	206.3
Not Stated	302.7
Adjusted benchmark	12,651.8

TABLE A6: Adjustments made to August 1991 Labour Force Survey estimates, after adjustments for scope differences and Census Not Stated codes, for additional questions in the Labour Force Survey

'000	Unemployed	Labour Force Status Not In Labour Force
Initial Labour Force Survey estimates	745.5	4,770.9
Add/Subtract:		
Didn't satisfy the 'looked for work' criteria	+65.9	-65.9
Were unable to start work	+36.5	-36.5
Adjusted Labour Force Survey estimates	847.8	4,668.5

Comparison of adjusted figures

The table below compares the 1991 Census and August 1991 Labour Force Survey figures, both before and after the adjustments explained above, for the Australian population aged 15 years and older. It shows that a large proportion of the difference between the unadjusted figures is explained by these known differences.

TABLE A7: Comparison of August 1991 Labour Force Survey estimates and 1991 Census counts for Labour Force Status before and after adjustments for scope differences, additional Labour Force Survey questions and Census Not Stated codes

'000	Labour Force Status				Total
	Employed	Unemployed	Not in the	Not Stated	
			Labour Force		
Unadjusted figures					
Census counts	7,109.3	931.6	4,736.3	308.4	13,085.7
Labour Force Survey estimates	7,631.7	798.3	5,029.4	0	13,459.3
Difference A	-522.3	133.4	-293.1	308.4	-373.7
Percentage	-7.3	14.3	-6.2	-	-2.9
Adjusted figures					
Census counts	7,017.6	929.3	4,699.6		12,646.4
Labour Force Survey estimates	7,135.4	847.8	4,668.5		12,651.8

Difference B	-117.9	81.5	31.0	-5.4
Percentage	-1.7	8.8	0.7	-0.0
Percentage of Difference A explained				
100*(1-B/A)	77.4	38.9	110.6	98.6

Comparison of 1986 and 1991 reconciliations

A reconciliation similar to that explained above was performed in 1986 by the Labour Force Section (see **Labour Force Research and Technical paper, No. 9, Comparison of estimates from the Labour Force Survey and the 1986 Population Census** (LFS, 1989)). There were a number of differences between the methods used however these can be corrected for.

The calculations for the Labour Force Survey benchmark were the same in 1986 and 1991 however the adjustment for the question on Availability to Start Work question included in the Labour Force Survey is slightly different. In 1986, the estimate of persons not available to start work obtained from the Labour Force Survey was subtracted from the Census count of Unemployed and added to the Census count of Not In the Labour Force. In 1991, rather than mix data from two sources, people who were not available to start work were reclassified for the reconciliation as unemployed in the Labour Force Survey, the code they would have been given in the Census. The figures from 1986 are recalculated in accordance with this and are shown in Table A8 below. In 1991 an additional adjustment was made for the additional looked for work question which was not made in 1986. For this comparison, this adjustment will not be included. The recalculated numbers are shown in Table A9 below.

TABLE A8: Adjustments made to July 1986 Labour Force Survey estimates, after adjustments for scope differences and Census Not Stated codes, for the question on Availability to Start Work in the Labour Force Survey

'000	Labour Force Status	
	Unemployed	Not In Labour Force
Initial Labour Force Survey estimates	555.4	4,457.9
Add/Subtract:		
Were unable to start work	+45.5	-45.5
Adjusted Labour Force Survey estimates	600.9	4,412.4

TABLE A9: Adjustments made to August 1991 Labour Force Survey estimates, after adjustments for scope differences and Census Not Stated codes, for the question on Availability to Start Work in the Labour Force Survey

'000	Labour Force Status	
	Unemployed	Not In Labour Force
Initial Labour Force Survey estimates	745.5	4,770.9
Add/Subtract:		
Were unable to start work	+36.5	-36.5

In 1986 all overseas residents in the Census (including those aged 0 to 14 years) were assumed to have a labour force status of Not In the Labour Force and were subtracted from the Census count of persons Not In the Labour Force. However, persons aged 0 to 14 years were excluded from all other parts of the reconciliation as the labour force questions were not applicable to them. Also, tables produced from 1986 data show that 22 per cent of overseas residents aged 15 and over were coded as being in the labour force. In 1991 overseas residents aged 15 years and older were excluded from the Labour Force Status category to which they were coded. In Table A10 below, the 1986 figures have been recalculated using the 1991 methodology.

TABLE A10: Adjustments made to 1986 Census counts for differences in scope and Census Not Stated codes

'000	Derived Labour Force Status			Not Stated	Total
	Employed	Unemployed	Not In the Labour Force		
Unadjusted Census counts	6,513.5	663.1	4,533.8	254.8	11,965.3
Subtract:					
Overseas residents	9.4	2.7	38.2	3.5	53.8
Defence personnel	70.0	0	0	0	70.0
Not Stated*	0	0	0	251.3	251.3
Adjusted Census counts	6,434.1	660.4	4,495.6	0	11,590.2

* Usual residents only

Table A11 below contains the results of the adjusted reconciliations for 1986 and 1991.

TABLE A11: Reconciliation of Labour Force Survey estimates and Census counts for Labour Force Status after adjustment for scope differences, the Availability to Start Work question and Census Not Stated codes, 1986 and 1991

'000	Labour Force Status			Total
	Employed	Unemployed	Not in the Labour Force	
		1986		
Census counts	6,434.1	660.4	4,495.6	11,590.2
Survey estimates	6,568.8	600.9	4,412.4	11,582.1
Difference	-134.7	59.5	83.2	8.1
Percentage	-2.09	9.01	1.85	0.07
		1991		
Census counts	7,017.6	929.3	4,699.6	12,646.4
Survey estimates	7,135.4	781.9	4,734.4	12,651.8
Difference	-117.9	147.3	-34.8	-5.4

About this Release

ABOUT THIS RELEASE

The aim of this paper is to provide an assessment of the quality of data on labour force status from the 1991 Census. The series of questions on the labour force is a very complex part of the Census form and final data quality depends on the quality of responses provided to the individual questions and to the rules applied in deriving final Labour Force Status codes.

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